MATING SWARMS OF A SOUTH AMERICAN *ACROPYGIA* (HYMENOPTERA: FORMICIDAE)[1]

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ABSTRACT: Observations of swarming behavior of the South American ant *Acropygia* sp. suggest it is more strongly outbreeding and more widely dispersing than *A. paramaribensis*. Both predominantly male and predominantly female swarms occur, and each female carries a coccid as she flies.

DESCRIPTORS: mating swarms, ants, symbiosis, outbreeding, dispersal, behavior

Ants of the myrmecine genus *Acropygia* live in subterranean colonies, collecting honeydew from coccids which live on plant roots, and have been described as pests of coffee (Bunzli 1935). Each female reproductive carries a coccid in her mouthparts as she leaves the maternal nest on her nuptial flight (Bunzli 1935, Brown 1945 and pers. comm.). This note describes some of the details of the events associated with the mating flight of a South American species of *Acropygia*. Dr. W. Brown very kindly identified the ants, which cannot be put to species at the present time; specimens have been deposited in the Museum of Comparative Zoology, Cambridge, Mass. 02138.

More than 100 swarms of reproductives were observed in and near Cali, Colombia in a zone described by Espinal and Montenegro (1962) as dry tropical forest. They occurred on sunny afternoons between about 17:00 and 18:00; typically there had been a rain in the morning or the evening before which broke a dry spell. The swarms seemed to be most common early in the rainy season, but occurred at other times also. They usually formed over lawns or other grassy areas, and generally hovered 1-15 feet above some sort of discontinuity such as a rock, a piece of paper, a person, etc. One swarm of males which was over a piece of paper consistently responded to my shaking the paper by abruptly rising several feet and then slowly drifting back down.

As shown in Table 1, swarms were usually either predominantly male or predominantly female. The flight patterns of individuals within a swarm were relatively constant. Females in female swarms flew mostly horizontally, making a quick pass through the swarm and then flying slowly back through it. Males in male swarms flew in more "dancing" patterns, with each individual making more or less figure-8 patterns from side to side. Although the ants tended to stay in swarms, appreciable numbers of both sexes were

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seen "wandering" alone in the general area of other swarms, and the swarms themselves sometimes dissolved more or less abruptly.

Pairs formed continuously in both male and female swarms, and fell to the ground below. Many were unisexual (two males or two females, depending on the sex predominating in the swarm), and quickly separated to rejoin the swarm. Bisexual pairs also fell, with the male holding onto but not copulating with the female. If the male maintained contact with her on the ground, the female remained more or less still, but she soon flew off if he lost contact. If the male succeeded in locking genetalia, the couple remained relatively quiet for about five minutes on the grass before separating. On two different occasions I was able to see that when pairs separated under male swarms, the male flew up to rejoin the swarm while the female flew off in a long, low arc, disappearing from sight 5-10 m away. In four cases in which I broke a pair apart prematurely, the female flew off in the same way.

On one occasion, reproductives were seen emerging from a nest(s) in a lawn of the grass *Paspalum* sp. (identified by L.S. Espinal) over which there were two male swarms. The reproductives, all females with coccids in their mandibles, came from many dispersed small holes. There were 1-10 workers around each hole. Each female climbed to the tip of a grass blade, and then took off. They all flew more or less straight up, and went very high and out of sight "despite" the presence of male swarms nearby. I estimated that more than 100 females flew up every minute from the 5 x 3m patch of lawn I was watching. Several *Ectatoma ruidum* (Ponerinae) were seen in the grass with female *Acropygia* in their mouthparts.

One afternoon, using flight pattern, ant size, and the presence or absence of coccids to distinguish male swarms from female swarms, I counted the swarms in a pasture (which included some brush and small trees) more than 200m long and 100m wide at its widest point. I noted 89 female swarms, 4 male swarms, and 2 swarms with appreciable numbers of both sexes. Although the swarms in the large field were scattered, all the swarms with males were in the same small sector. On another occasion I found 11 male swarms and 0 female swarms in an area about 200m away.

Males are apparently very short-lived. After netting a group of 108 males at about 17:30, I laid the closed net on my desk in front of an open window. When I returned to count the ants four hours later, the other insects which had also been captured – several acalyptrate flies, hemipterans, etc. – were all lively and flew off when I opened the net; but the ants were all very feeble, none being able to fly, and 58 were immobile and apparently already dead.

Discussion

The descriptions of swarming behavior in *A. paramaribensis* (Bunzli 1935)

and *A.* sp. probably *acutiventris* (Brown 1945, pers. comm.) offer several points of comparison. The two species are similar to the one of this study in the following characteristics: females carry coccids (the "aphids" reported by Brown were coccids – pers. comm. W. Brown); swarming occurs during the day and is associated with previous rain; (at least for *A. paramaribensis*) many small holes are opened for the exit of the reproductives; and the flight patterns of male and female *A.* sp. prob. *acutiventris* are apparently similar.

They both differ from the species of this study in that they couple in flight rather than on the ground. In addition, *A. paramaribensis* differs in the following ways: swarms are much larger, consisting of up to millions of individuals; one sample showed a swarm to be composed of similar numbers of males and females; emerging females fly from the ground directly into swarms overhead; and the females, after landing following mating, seek shelter underground (apparently often within the maternal colony) rather than flying off.

It is surprising to find such marked differences in behavior of congeneric species. The species of this study is evidently more strongly outbreeding and more widely dispersing than *A. paramaribensis.*

Table 1. Composition of swarms of *Acropygia* sp. reproductives (close to the entirety of each swarm was collected with repeated passes of an insect net).

Date	Number of males	Number of females
17V172	2	44
17V172	1	17
22V73	0	108
26V73	3	263 (plus 1 worker)
6VIII73	1	7
6VIII73	19	3
15X174 (4 swarms collected into same net)	108 (total)	0

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